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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,607	03/01/2004	Li-Shyue Lai	67,200-1259	2041
<div>7590 TUNG & ASSOCIATES Suite 120 838 W. Long Lake Road Bloomfield Hills, MI 48302</div>				
<div>07/09/2008</div>				
<div>EXAMINER THOMAS, TONIAE M</div>				
<div>ART UNIT 2822</div>				
<div>PAPER NUMBER</div>				
<div>MAIL DATE 07/09/2008</div>				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/791,607

Applicant(s)

LAI ET AL.

Examiner

Toninae M. Thomas

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-33 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 26-33 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

1. This Office action is in response to Applicant's reply received on 25 March 2008. Claims 26-33 are currently pending.
2. The indicated allowability of claims 28-33 is withdrawn in view of the newly discovered reference to Lowrey et al. (US 6,969,866 B1). Rejections based on the newly cited reference follow.

Drawings

3. The drawings are objected to because reference number 24A is used to identify the conductive plug in Figure 1B. Since the conductive plug is first identified using the reference number 14A (e.g. see Fig. 1A and specification at page 7, lines 6-8), reference number 24A in Figure 1B should be changed to 14A.
4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. Claims 26-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
6. Claim 26 has been amended to recite the limitation *a spacer comprising a phase changing material sensitive to temperature and having a partially exposed sidewall region at the spacer upper portion defining a phase change memory element contact area*. The specification as originally filed provides support for a spacer with a partially exposed sidewall region at the spacer upper portion (see Figure 1D and accompanying text). The originally filed specification, however, does not provide support for a spacer comprising a phase changing material as recited in claim 26. Thus, the recitation *a spacer comprising a phase changing material sensitive to temperature* is new matter.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 30-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase *the electrode contact area* lacks antecedent basis (claim 30, line 4).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 26-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Lowrey et al. (US 6,969,866 B1).

The Lowrey et al. patent (referred to hereinafter as Lowrey) discloses a phase change memory structure (see Figs. 7, 8A-8E and accompanying text). The memory structure comprises the following elements: a substrate 102 comprising a conductive area, drain region 112 (Fig. 7 and col. 11, lines 32-35)¹; a spacer 344 having a partially exposed sidewall region at the spacer upper portion defining a contact area (Fig. 7 and col. 11, lines 46-47)^{2,3}; wherein the spacer comprises a conductive material (col. 12, lines 50-55) and a spacer bottom portion partially overlaps the conductive area, drain region 112 (see Fig. 2)⁴.

The conductive material can comprise TiN or TiAlN (col. 12, lines 50-55).

¹ The drain regions 112 are shown in an alternate embodiment (see Fig. 2 and col. 5, lines 39-43).

² The partially exposed sidewall region at the upper portion of the spacer 344 is that portion of the spacer vertically elevated above the top surface of the spacer 342.

³ The contact area is formed at the interface between the top surface of the spacer 344 and the bottom surface of the phase changing memory element.

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The phase change memory structure further comprises: a phase changing memory element 250 sensitive to temperature; and an upper conductive electrode 270 on the phase changing memory element (Fig. 7 and col. 12, lines 20-22).

The phase change changing memory element 250 comprises a chalcogenide (col. 16, lines 7 - col. 17, line 7). The chalcogenide, in turn, comprises a material selected from the group consisting of Ge, Te, and Sb and their alloy system (col. 16, lines 7 - col. 17, line 7).

The upper conductive electrode 270 may comprise W, TiN, TiW, or TiAlN (col. 9, lines 29-36).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TMT
02 July 2008

/Toniae M. Thomas/
Examiner, Art Unit 2822

⁴ In the embodiment of Figure 7, the dual conductive spacer 342, 344 is an equivalent to spacer 130a or spacer 130b of Figure 2. In Figure 2, spacers 130a and 130b overlap the conductive area, drain 112.